

**Environmental Impact Assessments for Decommissioning and
Dismantling : analysis of existing frameworks and
recommendations for improving effectiveness**

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Extensive summary

In this paper we have examined the main legal instruments governing the final phase of a nuclear power plant, leading to decommissioning and dismantling. We have highlighted the ambiguity between nuclear safety terminology and the environmental legal framework, particularly in relation to the definitions of decommissioning and dismantling.

The paper argues that EIA legislation should apply after a plant has been shut down, when decommissioning begins. Dismantling, a critical component of this phase, requires specific authorizations beyond the operating license. The use of these terms in treaties such as the Espoo Convention, the Aarhus Convention and the EIA Directive creates confusion as to what constitutes a project requiring an EIA, particularly in terms of transboundary consultation and public participation. A specific case law example is explained in detail.

We emphasize that projects must have significant environmental effects in order to trigger an EIA obligation, thus reinforcing the protective aim of legal texts concerning public safety and the environment. To improve legal clarity for future decommissioning projects, we recommend a consistent approach by international and European stakeholders.

In addition, we stress the importance of complying with both the EIA and Habitats Directives, which address the broad environmental and health challenges of nuclear decommissioning. This dual compliance ensures thorough risk assessment and biodiversity protection, and promotes a balanced approach to safety, environmental responsibility and legal accountability in the decommissioning process.

1 INTRODUCTION

1. The decommissioning and dismantling of nuclear facilities presents complex challenges that require rigorous environmental assessment. This paper focuses on the environmental challenges for the existing nuclear fleet that has been or will be decommissioned. Many countries in the EU and around the world are at the beginning of the process of decommissioning their nuclear power plants. An important tool in this process is the Environmental Impact Assessment (hereinafter: “EIA”), which defines the environmental limits within which decommissioning will take place, as well as the procedural guidelines.

2. In this paper, we explore the intersection of international and European legal frameworks governing EIA for the decommissioning and dismantling of nuclear facilities. We begin by outlining the relevant international treaties, such as the Espoo and Aarhus Conventions, and the role of International Atomic Energy Agency (hereinafter: “IAEA”) standards in shaping EIA requirements. The discussion then shifts to a detailed analysis of EU legislation in this area, with a particular focus on the EIA Directive, the environmental obligations under the Euratom Safety Directives for decommissioning purposes and the Habitat Directive.

Particular attention is paid to recent case studies illustrating the practical challenges and legal disputes arising from the decommissioning process, such as the decommissioning of nuclear installations in Belgium. These examples highlight the dynamic interplay between compliance with EIA protocols and the broader objectives of environmental protection and public health and safety concerns.

Our contribution not only deepens the understanding of existing legal frameworks, but also proposes recommendations for harmonising international and European standards to improve the effectiveness and efficiency of EIA in the nuclear sector in the context of decommissioning.

2 DECOMMISSIONING AND DISMANTLING AND ENVIRONMENTAL IMPACT ASSESSMENT

3. In order to provide a clear overview of the interaction between ‘decommissioning and dismantling’ and ‘environmental impact assessment’, it is necessary to discuss the main legal instruments that define these terms.

2.1 Decommissioning and Dismantling

(a) IAEA

4. First, we examine the IAEA's approach.

According to the IAEA's General Safety Requirements decommissioning is regarded as the final stage in the lifecycle of a nuclear power plant¹:

“1.1. The terms ‘siting’, ‘design’, ‘construction’, ‘commissioning’, ‘operation’ and ‘decommissioning’ are normally used to delineate the six major stages in the lifetime of an authorized facility and of the associated licensing process. The term ‘decommissioning’ refers to the administrative and technical actions taken to allow the removal of some or all of the regulatory controls from a facility (except for the part of a disposal facility in which the radioactive waste is emplaced, for which the term ‘closure’ instead of ‘decommissioning’ is used). Aspects of decommissioning have to be considered throughout the other five major stages.

1.2. Aspects of decommissioning typically include planning for decommissioning, conducting decommissioning actions and terminating the authorization for decommissioning. There may be a period of transition between permanent shutdown (the term ‘permanent shutdown’, as used in this publication, means that the facility has ceased operation and operation will not be recommenced) and the granting of authorization to begin decommissioning actions”. (Own emphasis)

Nuclear decommissioning within the nuclear energy sector thus is “*an umbrella term given to all activities that enable nuclear facilities to be permanently shut down, decontaminated, dismantled and released from regulatory control. Decommissioning is not complete until radioactive and other hazardous materials have been removed from the site, and the buildings and land which were formerly used as nuclear facilities have been prepared for new uses. The final step (of the decommissioning process) involves extensive surveys to confirm the absence of any significant radioactivity on the site, enabling its release from regulatory control.*”²

¹ IAEA, Decommissioning of Facilities, IAEA Safety Standards Series No. GSR Part 6, IAEA, Vienna (2014), 1.1 – 1.2.

² Patrick OSullivan, *Nuclear Decommissioning, Addressing the past and ensuring the future*, IAEA Bulletin April 2023 volume 64-1, “nuclear decommissioning”.

The following infographic illustrates the difference to be understood when the IAEA refers to the terminology of decommissioning and dismantling:³



5. Decommissioning is therefore a broader concept than dismantling.

Decommissioning is the terminology used to describe the final stage in the life cycle of a nuclear power plant. Once a nuclear power plant has been permanently shut down, it moves from being a facility with operational processes for electricity production to activities associated with the preparation and implementation of decommissioning, including changes to the organisation and safety systems of the plant.

Dismantling is only a part of that phase and aims to remove and/or decontaminate equipment and structures, systems and components of a plant containing radioactive material to a level that allows the plant to be released from regulatory control for unrestricted use or with restrictions on its future use. More specifically, this is the approach in the case of immediate dismantling. In the case of deferred dismantling, after the nuclear fuel has been removed from the facility (for nuclear installations), all or part of a facility containing radioactive material is either processed or brought to a condition in which it can be safely stored and the facility maintained until it is subsequently decontaminated and/or dismantled.⁴

³Infograph Joanne Liou, *IAEA Bulletin* April 2023, volume 64-1, “nuclear decommissioning”.

⁴ IAEA, Decommissioning of Facilities, *IAEA Safety Standards Series*, No. GSR Part 6, Vienna (2014), 1.8-1.9.

(b) **EURATOM**

6. There are several references to decommissioning and dismantling in the EURATOM Treaty.

A specific definition is to be found in the Commission Recommendation 2010/635/Euratom of 11 October 2010 on the application of Article 37 of the Euratom Treaty⁵. In footnote 8 the Commission provides the following clarification, in line with the IAEA approach:

“Decommissioning comprises all technical and administrative procedures, activities and measures taken after the final shut-down of a facility and up to the release of the site for unrestricted or other licensed use. Within these activities ‘dismantling’ comprises disassembling, cutting and demolition of contaminated or activated components, systems and structures including their packaging and transfer off-site.”

Further references can be found in the Council Regulation (Euratom 2021/100 of 25 January 2021 establishing a dedicated financial programme for the decommissioning of nuclear facilities and the management of radioactive waste, and repealing Regulation (Euratom) No 1368/2013⁶ where *“decommissioning means administrative and technical measures in accordance with national law which allow the removal of some or all of the regulatory controls from a nuclear facility and which aim to ensure the long-term protection of the public and the environment, including the reduction of the levels of residual radionuclides in the materials and on the site of the nuclear facility”* (Article 2 (1)).

7. The Commission and the IAEA thus share the same interpretation of the use of the terms decommissioning and dismantling. Let us now look at how these terms are used in the EIA framework.

2.2 **Environmental impact assessment (EIA)**

8. The subject matter of an EIA in the EU is regulated by several international and

⁵ OJ L 279, 23.10.2010, p. 36–67.

⁶ OJ L 34, 1.2.2021, p. 3–17.

European legal instruments. The main question always is whether and to what extent a particular project or decision, in the context of a decommissioning process, must be preceded by an environmental impact assessment.

(a) ***ESPOO Convention***

9. The Convention on Environmental Impact Assessment in a Transboundary Context, adopted in Espoo (Finland) on 25 February 1991 (hereinafter: ‘ESPOO Convention’), defines the obligations of the Parties to carry out an environmental impact assessment in a Transboundary Context for the listed activities, and this prior to the decision making⁷. The Espoo Convention addresses “*the need to give explicit consideration to environmental factors at an early stage in the decision making process by applying environmental impact assessment, at all appropriate administrative levels, as a necessary tool to improve the quality of information presented to decision makers so that environmentally sound decisions can be made paying careful attention to minimizing significant adverse impact, particularly in a transboundary context*”. The convention incorporates Principle 10 of the Rio Declaration of 12 August 1992 and aims to ensure that its parties assess the environmental impact of certain activities at an early stage of planning, and notify and consult each other on the activities listed in the convention that are likely to have a significant adverse transboundary (cross-border) impact. The main principles of the Espoo Convention are the following:

- in accordance with the precautionary and prevention principles, it requires that the adverse environmental impacts be anticipated and addressed early in the planning of activities in order to prevent/mitigate and monitor their significant adverse transboundary environmental impact;
- it requires the state in which the activity is planned (party of origin) to examine its environmental impacts on other states (affected parties);
- the party of origin must notify the affected party of the activity likely to have a significant adverse transboundary environmental impact;
- the affected party must acknowledge the notification and indicate whether it wishes to participate in the assessment procedure;

⁷ In addition, the Protocol on Strategic Environmental Assessment, which entered into force on 11 July 2010, requires that a strategic environmental assessment be carried out for certain plans and/or programmes that are likely to have significant environmental effects. As the focus of this paper is on decommissioning projects, this instrument will not be further discussed.

- the party of origin must prepare an environmental impact assessment documentation and submit it for comments to the authorities and the public of the affected party/parties;
- the parties concerned should consult each other, for example, on alternative and mitigation measures;
- the party of origin must take a decision on the planned activities while taking into account the environmental impact documentation, the comments received and the outcome of the consultations;
- the final decision should be provided to the affected party with the reasons and considerations on which it was based.

There are currently 48 Parties to the Espoo Convention⁸. The EU is also a Party, which means that EU and EURATOM law must be consistent with the provisions of the Espoo Convention.

10. The convention obligations apply to proposed activities in its Appendix I. Article 1 (5) defines a ‘proposed activity’ as follows: “*Proposed activity: means any activity or any major change to an activity subject to a decision of a competent authority in accordance with an applicable national procedure*”. The specific activities listed in Appendix I provide further clarification of the concept of proposed activities and include oil refineries, airports, thermal and hydropower plants and wind farms, roads, railways, large diameter pipelines for the transport of oil, gas or chemicals. ⁹ Appendix I, 2 (b) includes “*nuclear power stations and other nuclear reactors, including the dismantling or decommissioning of such power stations or reactors 1/ (except research installations for the production and conversion of fissionable and fertile materials, whose maximum power does not exceed 1 kilowatt continuous thermal load)*”. Footnote 1 clarifies this: “*For the purposes of this Convention, nuclear power stations and other nuclear reactors cease to be such an installation when all nuclear fuel and other radioactively contaminated elements have been removed permanently from the installation site.*”

11. Although the Espoo Convention lacks a specific definition for decommissioning or dismantling, these activities clearly fall within its scope. This raises the question of when these

⁸ The current list of contracting parties can be found here: https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-4&chapter=27&clang=en.

⁹ Opinion advocate-general 29 November 2018, C-411/17, points 75-76; ECJ 17 March 2011, *Brussels Hoofdstedelijk Gewest and Others*, C-275/09.

obligations should take effect and, consequently, which specific actions in the decommissioning or dismantling process require a preceding EIA and transboundary consultation. Should these obligations begin at the point of shutdown, marking the transition to decommissioning? Or did the Contracting Parties intend, consistent with nuclear safety practices, for the environmental impact assessment to occur at the actual dismantling stage - where a specific license is required - and thus regard decommissioning as synonymous?

The answer to this question is not only of theoretical importance, but could also have far-reaching practical consequences. If the entire process of decommissioning, including the transition period, is to be subject to EIA and transboundary consultation, the subject matter of EIA and transboundary consultation will be of a very different nature than if EIA and transboundary consultation is limited to the environmental impacts of the actual physical dismantling operations. The nature of the environmental issues and public input prior to final closure, as a first step in the decommissioning process, will by definition be of a more general nature than when the subject matter is physical dismantling.

12. The legal confusing is due to the fact that both decommissioning and dismantling are considered to be a proposed activity under the Espoo Convention, in combination with a broad interpretation of Appendix I by the Advocate General of the European Court of Justice in the Doel 1 and 2 case, according to which, in the case of nuclear power stations, the operation of a nuclear power station in itself is a proposed activity without the need for specific action.¹⁰

Indeed, as we will see, in the EU, Member States can look to the EIA Directive for guidance on interpreting the Espoo Convention and at what stage in a decommissioning process an EIA is required. For a project to fall within the scope of the EIA Directive, it must consist of physical works or other interventions in the natural environment. Although there is no reference to such

¹⁰ Opinion advocate-general 29 November 2018, C-411/17, points 77-78:

“77. There are thus some types of activity which are characterised by specific actions, such as deforestation of large areas (Appendix I, point 17 to the Espoo Convention) or construction of motorways, express roads and lines for long-distance railway traffic and of certain airports (point 7). Nevertheless, the vast majority of the types of activity covers certain kinds of installations or facilities in themselves, such as crude oil refineries (point 1), major installations for the initial smelting of cast-iron and steel and for the production of non-ferrous metals (point 4) or integrated chemical installations (point 6).

78. Nuclear power stations (Appendix I, point 2 to the Espoo Convention) come under this second category. The Espoo Convention Implementation Committee rightly inferred from this that not only the construction and first operation of a nuclear reactor is an activity, but also the continued operation beyond the originally authorised lifetime of a nuclear reactor, as a significant adverse transboundary impact is likely to be caused by such operation. (37) Accordingly, the renewal of consent for a nuclear power station also constitutes an activity.”

physical works or interventions in the natural environment in the Espoo Convention, the definition of ‘proposed activity’ (“*any activity or any substantial change to an activity that is subject to a decision by a competent authority in accordance with an applicable national procedure*”) suggests a similar result, since in most jurisdictions it is the physical works and interventions in the natural environment that are subject to a decision by a competent authority. For example, a decision to shut down a nuclear installation with a view to decommissioning is taken by the operator of the nuclear installation, not by the authorities. With this in mind, the preferred interpretation is that it is only when there are physical works aimed at dismantling a nuclear power plant that there is a proposed activity under the Espoo Convention. However, additional guidance should be provided by the Espoo Convention bodies.

(b) ***Aarhus Convention***

13. The Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, adopted in Aarhus on 25 June 1998 (hereinafter: ‘Aarhus Convention’), is also relevant to public participation in this case. The Aarhus Convention refers to the public’s right to participate in environmental decision-making. Public authorities are obliged to allow the public and environmental NGOs to participate meaningfully in decision-making on projects affecting the environment and on plans and programmes relating to the environment (Article 6). There are now 47 Parties to the Convention¹¹. The EU is also a Party and, similar to the Espoo Convention, this is reflected further in the paper with regard to interpretation under the EIA Directive.

Article 6(1) of the Aarhus Convention refers to Annex I for the list of the proposed activities to which the provisions of the convention apply: “*Nuclear power stations and other nuclear reactors including the dismantling or decommissioning of such power stations or reactors 1/ (except research installations for the production and conversion of fissionable and fertile materials whose maximum power does not exceed 1 kW continuous thermal load);* With a footnote 1/ *Nuclear power stations and other nuclear reactors cease to be such an installation when all nuclear fuel and other radioactively contaminated elements have been removed permanently from the installation site.*”. The Aarhus Convention doesn’t include a definition of decommissioning/dismantling.

¹¹ Current list of Parties to the Aarhus Convention can be found here:
https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtdsg_no=XXVII-13&chapter=27&clang=en.

The Annex to the Aarhus Convention is similar to that of the Espoo Convention. However, there is a difference in that the Aarhus Convention doesn't require a proposed activity to have a significant adverse environmental impact in order for it to apply and to trigger the need for effective public participation (Article 6). The annex of the Aarhus Convention is in line with that of the Espoo Convention.¹²

14. As is the case with the Espoo Convention, it is unclear what the rationale of the Contracting Parties as for using both the terms decommissioning and dismantling. Article 1 of the Aarhus Convention states the objective of the Convention as follows: *“In order to contribute to the protection of the right of every person of present and future generations to live in an environment adequate to his or her health and well-being, each Party shall guarantee the rights of access to information, public participation in decision-making, and access to justice in environmental matters in accordance with the provisions of this Convention.”*. The analogy we made for the Espoo Convention should, in our view, apply here as well: the objective of the decommissioning phase is the protection of the public and the environment. The moment when a decision is made in this process that can be relevant to the protection of the public and the environment is when the dismantling is to be licensed, and this is at the moment before a decision is made on the proposed activity.

(c) ***EIA Directive***

(i) *General legal framework*

15. For the EU, the main legal instrument governing Member States' obligations regarding environmental impact assessment, is the EIA Directive¹³.

The EIA Directive applies to the environmental impact assessment of public and private projects likely to have significant effects on the environment (Article 1(1)). A 'project' is

¹² Opinion advocate-general 29 November 2018, C-411/17, points 91-92:

“91. Article 6(1)(a) of the Aarhus Convention provides that Article 6 is to be applied to decisions on whether to permit proposed activities listed in Annex I. The term ‘activity’ corresponds to the term ‘project’ used in the EIA Directive.

92. The fifth indent of point 1 of Annex I to the Aarhus Convention mentions ‘nuclear power stations’ and no threshold is defined with respect to commercial use. Unlike in the Espoo Convention, there is no requirement for an assessment whether such a project causes a significant adverse environmental impact in a specific case.”

¹³ Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment 2011/92/EU as amended by Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, *OJL* 26, 28.1.2012.

defined as:

- the execution of construction works or of other installations or schemes;
- other interventions in the natural surroundings and landscape including those involving the extraction of mineral resources (Article 1(2)).

16. Article 2(1) of the EIA Directive requires Member States are to take the necessary measures to ensure that, before consent is given, projects likely to have significant effects on the environment, having regard, inter alia, to their nature, size or location, are made subject to a requirement for development consent and that their effects on the environment are assessed. Such projects are defined in Article 4 of the EIA Directive.

Pursuant to Article 4(1), and subject to Article 2(4), the projects listed in Annex I shall be subject to an assessment in accordance with Articles 5 to 10.

Annex I, Section 2(b) states the following : *Nuclear power stations and other nuclear reactors including the dismantling or decommissioning of such power stations or reactors (1) (except research installations for the production and conversion of fissionable and fertile materials, whose maximum power does not exceed 1 kilowatt continuous thermal load).* The footnote further clarifies that: “ *Nuclear power stations and other nuclear reactors cease to be such an installation when all nuclear fuel and other radioactively contaminated elements have been removed permanently from the installation site.*”.

The terms ‘dismantling’ and ‘decommissioning’ are not defined in the EIA Directive itself. The original EIA Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment didn’t include dismantling or decommissioning in Annex I. The inclusion of dismantling and decommissioning was adopted by the Directive 97/11/EC of 3 March 1997 amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment without a specific reference to the *ratio legis* behind the inclusion of the terminology.

17. According to the case-law of the Court of Justice, if a category of projects is open to different interpretations, must be interpreted in the light of the general scheme and objective of

the legislation of which it forms part¹⁴. The main aim of the EIA Directive is to require projects with significant environmental effects to undergo an environmental impact assessment before development consent (a permit) is granted¹⁵. When interpreting the terms ‘dismantling’ and ‘decommissioning’, therefore, it is not possible to ignore the fact that the projects must have a significant environmental impact.

18. The lack of a definition in the EIA Directive was the main issue in a case brought before a Belgian court¹⁶. The case was initiated following the closure of the Doel 3 nuclear power plant on 24 September 2024. This was done on the basis of the Nuclear Phase-out Act of 31 January 2003.

The plaintiffs in this civil case argued that all acts following the shutdown were subject to an EIA on the basis of the EIA Directive.

The plaintiffs wanted the Belgian State to “*demand a project EIA of the operator of the nuclear power plant Doel 3 (taking into account public consultation following a public inquiry) by an expert recognised for that purpose before initiating, carrying out or continuing any act, measure or activity that falls within the concept of decommissioning or dismantling (within the meaning of section 2b of Annex I to the project EIA Directive 2011/92/EU) and then to act accordingly itself...*”.

Specifically for the Belgian situation, the shutdown of electricity production and related safety aspects, including the removal of nuclear fuel and industrial waste and the flushing and emptying of the pipes, can be carried out under the current operating licence for the Doel 3 unit¹⁷.

The Belgian Nuclear Regulatory Authority describes this as follows (translation from Dutch):

“Between the shutdown of the installation and the approval of the dismantling license, there is a transitional period, the so-called ‘phase after cessation of activities’. This

¹⁴ ECJ 24 October 1996, *Kraaijeveld*, C-72/95; ECJ 16 September 2004, *Commission/Spain*, C-227/01.

¹⁵ ECJ 19 September 2000, *Linster*, C-287/98; ECJ 16 September 2004, *Commission/Spain* nr. C-227/01.

¹⁶ Rb Brussels 16 November 2022, unpublished.

¹⁷ Elements of authorization: <https://fanc.fgov.be/nl/dossiers/kerncentrales-belgie/stopzetting-van-de-activiteiten-en-ontmanteling-van-de-belgische>.

phase is still covered by the operating license and ends at the start of the dismantling activities, which then fall under the dismantling license.

In this second phase, Electrabel is still waiting for the dismantling license, but a number of preparatory works for the dismantling may already be carried out. These preparatory works and the associated safety aspects are described in advance in the cessation notification. These include the removal of nuclear fuel and operational waste and the flushing and emptying of pipes. Such works may be carried out under the operating license, because they are activities that are also carried out when a reactor is still operational. However, for all real dismantling activities, Electrabel must wait for the dismantling license. Some (administrative) buildings that are not related to nuclear activities can be dismantled without applying for a license from the FANC.”

This approach of the Belgian regulator is similar to those in other European countries. An overview of the approaches following the closure of an NPP has been carried out under ENSREG¹⁸. As regards the existence of a ‘transitional period’ after the operational phase and before the actual dismantling work begins, it concluded that: *“The most reported situation is that during the transition period the operating license remains in force. Operations performed during this period aiming to prepare decommissioning should not result in a significant modification to the facility or its authorized operating conditions, i.e., such modifications can only be minor or nonsignificant. France, Germany, Belgium, Italy, The Netherlands and Romania apply this principle strictly and report that any decommissioning activity that is not expressly covered by the operating license will require decommissioning license. Other countries applying this principle are Lithuania, Slovakia or Sweden.”* These findings make the Belgian case relevant to other European countries as well, since the Belgian court has interpreted the applicable European principles.

19. In order for there to be an obligation to subject the decommissioning and associated works to the requirement of prior authorisation with an environmental impact assessment, there must therefore first be a ‘project’ within the meaning of the EIA Directive that has significant environmental effects. According to the established case law of the Court of Justice, the term

¹⁸ Comparison of national policies for decommissioning-October 2023 <https://www.ensreg.eu/document/comparison-national-policies-decommissioning-october-2023>.

‘project’ refers to works or interventions that change the material condition of the site¹⁹. It is clear and undisputed that the actual dismantling of a nuclear power station qualifies as “*works or interventions that change the material condition of the site*”.

20. The Belgian Court also took note of the IAEA’s General Safety Standards (see above) that a transition period between the permanent cessation of operations and the approval of the final decommissioning plan is in line with the general approach to nuclear safety²⁰.

The use of the terms dismantling and decommissioning was found by the Court to be in line with the European Regulation:

“The claimants do not sufficiently explain why the Belgian definitions of dismantling and decommissioning would not be in line with European law and in particular with the words dismantling or decommissioning referred to in the EIA Directive. In the light of the definition adopted by the European Commission in the aforementioned opinion of 11 October 2010, there appears to be no, prima facie, problem since dismantling or decommissioning is considered to be the procedures, measures and activities that follow the definitive closure of a facility, and no problem appears to arise in the context of the EURATOM definition either, which speaks of measures aimed at ensuring the long-term protection of the population and the environment. Both definitions leave open, prima facie, in accordance with the purpose and scope of the EIA Directive, the possibility of certain, in this case even apparently reversible, actions aimed at a transition, namely the period between the cessation of electricity production and the definitive closure (shutdown) of the plant or reactor.

European legislation does not provide - at least at first sight - that after the cessation of electricity production a phase of dismantling or decommissioning as referred to in Annex I to the EIA Directive immediately begins.”

21. For Belgium, based on this case law, the position is clear that the transition period after decommissioning, which is considered part of the final phase in the life of an NPP (cf. IAEA), is not in itself a project requiring an EIA. The Belgian approach to the EIA Directive is that

¹⁹ Judgment of 29 July 2019, *Inter-Environment Wallonie ASBL*, C-411/17,

²⁰ IAEA, *Decommissioning of Facilities*, IAEA *Safety Standards Series*, No. GSR Part 6, IAEA, Vienna (2014), 7.8 and 8.10.

decommissioning and dismantling, as used in Annex I, are synonyms referring to the actual dismantling phase as described by the IAEA and EURATOM.

However, as the work of ENSREG shows, there are different approaches possible to the post-closure period. In the EU itself there are different approaches too, depending on whether the post-operational transition period is covered by the operating licence, the decommissioning licence or even a separate licence²¹. This can lead to an uncertainty within the EU and broader for the Contracting Parties under the ESPOO and Aarhus Convention. On the basis of the *ratio legis* of the legal framework it should be clear that there is only a proposed activity or project when a possible impact on the environment is to be considered, not already covered by the operating license. This will most likely be the case when the works for the effective dismantling of the nuclear power plant.

(ii) *EIA and nuclear waste management*

22. The impact of nuclear waste is a critical component that must be considered in an EIA for nuclear decommissioning. Nuclear waste management is one of the most significant environmental and health risks associated with decommissioning due to the potential for long-lasting contamination.

23. According to the case-law of the Court of Justice, all identifiable impacts of a given project consisting of different components should be identified at the earliest possible stage. In this respect, the management of radioactive waste resulting from decommissioning activities is inevitably linked to the decommissioning itself. This means that, as early as the approval of a decommissioning project, the government should have an insight into the potential significant effects of the further management of the radioactive waste, insofar as they are already identifiable. We thereby think of the following effects:

- waste generation and classification. An EIA must assess the types and volumes of nuclear waste generated during decommissioning. This includes categorizing waste by

²¹Comparison of national policies for decommissioning-October 2023, p. 13 <https://www.ensreg.eu/document/comparison-national-policies-decommissioning-october-2023>:

“The transitional period is key to determine the assumption of responsibilities among the license holder for operation of the NPP, and the one in charge of decommissioning the facility. The question whether the transitional period should be part of an operational or decommissioning license, or even constitute a separate license, can become very relevant, not only for posing important differences in terms of safety at licensing, but also for financial estimates and distribution of costs. On the other hand, in countries where the license holder during the operation of the NPP is also the legal entity entrusted to decommission the facility, the transitional period may be also a critical time during which the license holder faces the challenge of adapting to the changing nature of activities from operation to decommissioning.”

its radioactivity level (low, intermediate, or high-level waste) and identifying specific hazardous materials, like spent fuel, contaminated equipment, and radioactive soil.

- transportation and storage risks. The EIA evaluates risks associated with transporting nuclear waste from the decommissioning site to storage or disposal facilities. This includes assessing the potential for accidents, spills, or contamination along transport routes and any impacts on air, water, and soil quality. For waste that will be stored on-site or nearby, the EIA must address the suitability of storage facilities, containment measures, and long-term security. Proper storage is especially vital for high-level waste, which requires shielding and cooling to prevent radiation release.
- contamination control and pollution prevention. The EIA must include measures for preventing and controlling contamination, particularly for soil and groundwater, as radioactive waste can pose risks to local ecosystems and human health if not properly contained.
- long-term monitoring and management. Given the long half-lives of radioactive materials, EIAs for decommissioning projects typically include plans for ongoing environmental monitoring. This involves setting up monitoring systems for air, soil, and groundwater around storage or disposal sites and having contingency plans in place to address potential leaks or contamination incidents.

24. The complexity and long-term considerations of nuclear waste management often require a separate decision-making process, independent of the decommissioning process itself. As the final disposal methods and facilities may be subject to regulatory developments, technological advances and site-specific considerations, disposal planning is treated as a separate stage with a separate EIA. In our view, this is not incompatible with the EIA Directive and ECJ jurisprudence, as the long-term management of nuclear waste and its disposal do not fall within the definition of decommissioning and are therefore not part of the same project. This approach also ensures that each component - decommissioning and waste management - receives a tailored and thorough environmental impact assessment. It allows flexibility in decision making and ensures that the disposal facilities are designed to the latest standards of safety, environmental impact and public health protection when they're ready to be implemented.

2.3 **Habitat Directive**

(a) *General legal framework*

25. The Habitats Directive has significant implications for nuclear decommissioning, particularly where decommissioning activities may affect protected habitats or species designated under Natura 2000. Nuclear decommissioning can involve significant earthworks and changes to land and water resources. Decommissioning may result in the release of pollutants or soil contamination, which may threaten sensitive habitats. Certain species (e.g. bats, amphibians, birds) may inhabit nuclear installations or surrounding areas.

26. Article 6 of the Habitats Directive imposes on Member States a number of specific obligations and procedures designed to maintain, or where appropriate restore, natural habitats and species of wild fauna and flora of Community interest at a favourable conservation status in order to achieve the more general objective of the Directive, which is to ensure a high level of environmental protection for the sites protected under the Directive. Article 6(3) of the Habitats Directive provides for an assessment procedure designed to ensure, by means of a prior assessment, that a plan or project not directly connected with or necessary for the management of the site concerned but likely to have a significant effect thereon is authorised only if it will not adversely affect the integrity of that site.

Article 6(3) distinguishes two stages in the required assessment procedure. The first, the subject of the first sentence of the provision, requires Member States to carry out an appropriate assessment of the implications for a protected site of a plan or project where there is a likelihood that the plan or project will have a significant effect on the site. The second, which is the subject of the second sentence and which follows from the appropriate assessment, allows such a plan or project to be authorised only if it will not adversely affect the integrity of the site concerned, subject to the provisions of Article 6(4) of the Directive. Appropriate assessment of the implications of a plan or project also means that, before the plan or project is approved, all aspects of the plan or project which, either individually or in combination with other plans or projects, may affect the conservation objectives of the site must be identified in the light of the best scientific knowledge available. The competent national authorities must not authorise an activity unless they are satisfied that it will not adversely affect the integrity of the site. This is the case where there is no reasonable scientific doubt as to the absence of such effects. In addition, in respect of sites classified as Special Protection Areas, the obligations under Article

6(3) of the Habitats Directive replace, pursuant to Article 7 of that Directive, any obligations under the first sentence of Article 4(4) of the Birds Directive from the date of classification under the Birds Directive if that date is later than the date of transposition of the Habitats Directive.

As the Habitats Directive does not define the term ‘project’, for the purposes of Article 6(3), according to the ECJ, account must be taken of the definition of ‘project’ in Article 1(2)(a) of the EIA Directive. The Court has previously held that if an activity is covered by the EIA Directive, it must, a fortiori, be covered by the Habitats Directive²². It follows that if an activity is regarded as a ‘project’ within the meaning of the EIA Directive, it may constitute a ‘project’ within the meaning of the Habitats Directive²³.

27. It follows from the case-law of the Court that the requirement to carry out an appropriate assessment of the implications of a plan or project under Article 6(3) of the Habitats Directive is conditional on the existence of a likelihood or risk that the plan or project will have significant effects on the site concerned. Taking account in particular of the precautionary principle, such a risk is deemed to exist where, in the light of the best scientific knowledge available, it cannot be ruled out that the plan or project may compromise the site’s conservation objectives. The assessment of that risk must take account, in particular, of the characteristics and specific environmental conditions of the site affected by such a plan or project²⁴.

(b) *When the assessment should take place*

28. The second sentence of Article 6(3) of the Habitats Directive specifies that following an appropriate assessment, the competent national authorities are to ‘agree’ to the project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.

It follows that the assessment must be conducted before agreement is given.

²² ECJ 7 November 2018, *Coöperatie Mobilisation for the Environment and Others*, C-293/17 and C-294/17, paragraph 65.

²³ ECJ 7 November 2018, *Coöperatie Mobilisation for the Environment and Others*, C-293/17 and C-294/17, paragraph 66.

²⁴ See, to that effect, ECJ 17 April 2018, *Commission v Poland (Białowieża Forest)*, C-441/17, paragraphs 111 and 112 and the case-law cited.

29. Furthermore, while the Habitats Directive does not define the conditions governing how the authorities ‘agree’ to a given project under Article 6(3) of that directive, the definition of ‘development consent’ in Article 1(2)(c) of the EIA Directive is relevant in defining that term. Accordingly, by analogy with the Court’s findings on the EIA Directive, if national law provides for a number of steps in the consent procedure, the assessment under Article 6(3) of the Habitats Directive, should, in principle, be carried out as soon as the effects which the project in question is likely to have on a protected site are sufficiently identifiable²⁵.

(c) *What to do in case of significant adverse impact ?*

30. In cases where nuclear decommissioning projects are expected to have a significant adverse impact on habitats or species protected by the Habitat Directive, compensatory measures can be required.

31. Before considering compensation, the decommissioning project must first explore options to avoid and mitigate potential impacts. This often involves adapting the decommissioning plan to reduce effects on habitats and species, such as scheduling work outside sensitive periods (e.g., breeding seasons), implementing pollution controls, or modifying techniques to limit habitat disruption. However, if the appropriate assessment concludes that adverse impacts are likely and no alternative solutions exist, the project can only proceed if it meets the strict requirements for compensatory measures under Article 6(4).

32. If no feasible alternative exists, and the project must proceed for “*imperative reasons of overriding public interest*,” – which decommissioning project undoubtedly are - compensatory measures are necessary to offset the impact. These measures aim to provide ecological compensation by creating or restoring habitats, enhancing existing habitats, or even designating new protected areas. Examples include:

- habitat restoration: restoring degraded areas either on-site or nearby to support similar species and ecosystem functions;
- habitat creation: creating new habitats elsewhere that provide the same ecological

²⁵ ECJ 29 July 2019, *Inter-Environnement Wallonie ASBL*, C-411/17, point 143.

functions as the impacted site;

- species protection initiatives: implementing programs to protect affected species, such as building artificial nesting sites, establishing new breeding areas, or funding research and conservation efforts for impacted species;
- designating new protected areas: sometimes, an entirely new area with similar ecological value may be designated as protected under Natura 2000.

33. Where, under the EIA framework, the authorities have a significant margin of discretion in implementing the conclusions of the EIA in a particular decommissioning or dismantling case, an appropriate assessment is therefore critical to the physical organisation of the decommissioning/dismantling activities.

(d) ***Interplay between EIA/AA and technical and regulatory safety requirements***

34. The decommissioning of nuclear facilities involves a complex interplay between stringent technical and regulatory requirements under EURATOM and IAEA standards, and the environmental considerations detailed in and EIA and an appropriate assessment.

EURATOM and IAEA set foundational standards for nuclear safety, covering aspects like radiation protection, waste management and accident prevention. These regulations provide technical benchmarks that all decommissioning activities must meet to minimize radiological risks to workers, the public, and the environment. While nuclear safety requirements set strict technical parameters for protecting people and the environment from radiation hazards, the EIA and appropriate assessment broaden the scope to assess a wider range of environmental impacts associated with decommissioning activities, including non-radiological effects, such as ecological impacts (potential impacts on local habitats, biodiversity and water resources beyond radiological risks) and pollution control (measures to mitigate dust, noise and chemical emissions that might arise during decommissioning but aren't directly related to nuclear safety).

35. In summary, while nuclear decommissioning is bound by technical safety standards, an EIA and appropriate assessment complement these by addressing the wider environmental impacts.

3 CONCLUSIONS

36. Our paper has provided an overview of the main legal instruments that are at play when looking at the final phase of a nuclear power plant. It has shown that the interaction between the nuclear safety terminology and the terminology used in environmental treaties and legislation isn't as clear cut as it should be.

37. When a nuclear power plant is shut down, the first issue that arises is the definition of decommissioning and dismantling. In our understanding, the objective of the EIA legislation is to come into play when, after shutdown, works are carried out to effectively dismantle the nuclear power plant. From a nuclear safety point of view, decommissioning has to be seen as the phase that starts after shutdown. Dismantling is to be seen as a part of the decommissioning phase that is not covered by the operating licence and for which a specific licence/decision ('development consent') is required.

The use of the terms 'decommissioning' and 'dismantling' in the ESPOO Convention, the Aarhus Convention, and hence the EIA Directive, creates confusion as to what constitutes a project or proposed activity requiring an EIA with possible transboundary consultation.

38. In our paper, we pointed out that when interpreting the concepts of 'dismantling' and 'decommissioning', it is therefore essential to stress that the projects must have significant environmental effects for there to be an EIA obligation. This conclusion is based on the fact that all legal texts aim to protect the public and the environment from the possible risks posed by a project/nuclear installation. In order to provide clarity for future decommissioning and dismantling projects, we recommend a common approach by all relevant international and European regulatory bodies to provide sufficient legal certainty on the stage at which the obligation to start the EIA process kicks in in the context of a decommissioning or dismantling project.

39. Compliance with EIA requirements and the Habitats Directive is crucial for nuclear decommissioning projects due to the comprehensive environmental, health and safety challenges associated with the decommissioning and dismantling of nuclear facilities. The EIA process ensures a thorough examination of both radiological and non-radiological impacts, enabling a holistic approach to managing potential risks to ecosystems, local communities and

public health. It guides the implementation of appropriate mitigation measures and promotes transparency through stakeholder engagement, which is particularly important for nuclear projects with far-reaching environmental impacts.

The Habitats Directive further protects biodiversity by requiring specific assessments and mitigation measures where decommissioning activities may affect protected habitats or species. This ensures that nuclear decommissioning is consistent with the EU's biodiversity conservation objectives and that the integrity of Natura 2000 sites and other ecologically sensitive areas is maintained. Where, under the EIA framework, the authorities have a significant margin of discretion in implementing the conclusions of the EIA in a particular decommissioning or dismantling case, an appropriate assessment of the physical organisation of the decommissioning/dismantling activities is critical.

Together, the requirements of the EIA and the Habitats Directive help to balance the technical requirements of nuclear safety with the environmental responsibility and legal accountability that underpin sustainable decommissioning.

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